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Declaration under Rule 4.17:
— *of inventorship (Rule 4.17(iv)) for US only*

Published:
— *with international search report*
— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: RADIAL EXPANSION SYSTEM

(57) Abstract: A radial expansion system.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US04/28831

A. CLASSIFICATION OF SUBJECT MATTER
IPC(7) : E21B 23/00; C21D 9/08; G01N 17/00
US CL : 166/380, 382, 207, 242.1; 148/593; 73/87
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 166/380, 382, 207, 242.1; 148/593; 73/87

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,E --- Y,E	US 2005/0217768 A1 (ASHAHI et al) 06 October 2005 (06.10.2005), see the entire patent, in particular Paragraphs [0052]-[0078], [0090]-[0113], [0117], [0123]-[0137] and [0153]-[0154].	1-5, 8,9,11,12,21-50,123-126,135-141 --- 6,7,10,13-17,18-20
Y,E	US 2004/0149431 A1 (WYLIE et al) (05 August 2004) (05.08.2004), see figures 2 and 13A-13E.	6,7
Y	US 6,273,634 A (LOHBECK) 14 August 2001 (14.08.2001), see figures 2 and 3.	10,13-17
Y,E	US 6,662,876 A (LAURITZEN) 16 December 2003 (16.12.2003), see perforated or slotted tubular 420a.	18-20
X,E	US 2004/0194966 A1 (ZIMMERMAN) 07 October 2004 (07.10.2004), see "upper portion" 106 and "lower portion" of an expandable tubular member 104.	119-122,127-130

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search
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Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US04/28831

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.: 194-198
because they relate to subject matter not required to be searched by this Authority, namely:
the claims are directed to a mathematical expression.

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
Please See Continuation Sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of any additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest
☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US04/28831

BOX III. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claim(s) 1-50, drawn to a method of forming a tubular liner within a preexisting structure.

Group II, claim(s) 119-122, drawn to an expandable tubular member.

Group III, claim(s) 123-126, drawn to an expandable tubular member..

Group IV, claim(s) 127-134, drawn to a method of radially expanding and plastically deforming a tubular assembly.

Group V, claim(s) 135-141, drawn to a method of manufacturing a tubular member.

The inventions listed as Groups I-V do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:
The special technical feature of the claims of Group I is a predetermined portion of the tubular assembly having a lower yield point than another portion thereof prior to the radial expansion and plastic deformation of the tubular assembly.
The special technical feature of the claims of Group II is the expandability coefficient of the expandable tubular member being greater than the expandability coefficient of another portion thereof.
The special technical feature of the claims of Group III is the tubular member having a higher ductility and a lower yield point prior to a radial expansion and plastic deformation than after the radial expansion and plastic deformation.
The special technical feature of the claims of Group IV is the use of less power to radially expand each unit length of the first tubular member than to radially expand each unit length of the second tubular member.
The special technical feature of the claims of Group V is the tubular member being processed after it has been positioned within a preexisting structure until it is characterized one or more final characteristics.
Inventions of Groups I-V lack unity because they do not rely on the same special technical feature as pointed out above